The Genus Steatonyssus Kolenati in the Ethiopian Region (Acarina : Laelaptidae)

by

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The genus *Steatonyssus* was erected by Kolenati (1858) to include the two species *St. periblepharus* Kol. and *St. brachypeltis* Kol., which are regarded by da Fonseca as being conspecific with *Dermanyssus murinus* Lucas, 1840. *Acarus musculi* Schrank, 1803, with which *Liponyssus pipistrelli* Oudemans, 1904 is synonymous (cf. da Fonseca, 1948), was later designated as type species.

The generic features of *Steatonyssus* have been adequately discussed by da Fonseca (1948) and by Zumpt & Patterson (1951). The genus is well characterised within the true *Liponyssinae* by the divided dorsal shield in the female sex, the opisthosomal part being relatively large, and by the sternal plate bearing three pairs of hairs.

The *Steatonyssus* species have most probably evolved from true *Liponyssus* forms with a large, undivided dorsal shield. The divided dorsal shield and a more or less pronounced reduction in the size of this plate are undoubtedly better adaptations to the blood-sucking habit, as they permit greater expansion of the body during the taking of a blood-meal.

A very interesting host-selection is shown by the *Steatonyssus* species, which, as far as is known, are restricted to bats and birds. Eight species, including the two new ones described below, have been recorded from the Ethiopian region and of these, four are associated with the *Microchiroptera* and four with birds belonging to the families *Ploceidae* (weavers), *Sturnidae* (starlings), *Passeridae* (sparrows), *Picidae* (woodpeckers) and *Apodidae* (swifts).

The same host-choice is probably true for the few species described from other parts of the world. According to Radford (1950), three species have been described from bats in the Palaearctic region, three from American bats and one from an Indonesian bat. An exception is *St. spinosus* Willmann, a species unknown to us, collected from an insectivore (*Solenodon*) on Haiti. Whether *Solenodon* is the true host for this species, or whether it had accidentally become contaminated, will have to be confirmed. These contaminations do undoubtedly occur. Schrank, for example, described his *Acarus musculi* from the house mouse, but this species was later recorded by Koch (as *Dermanyssus arcuatus*) and Oudemans (as *Liponyssus pipistrelli*) from bats. It is probable that the house mouse became contaminated while

running in bat-infested places. Another record which may be due to contamination is that of the Elephant Shrew mentioned by Hirst (1922) as the host of *St.nyassae*. We have checked numerous elephant shrews without finding this species, but have received specimens from a bat. As shrews are often found in places frequented by bats, it is quite possible that bat mites may accidentally migrate onto the shrews.

However, our knowledge of the taxonomy and host-restrictions of the genus *Steatonyssus* is not yet sufficiently advanced, so that a discussion of these problems is perhaps a little premature.

In this paper we propose to give a key to the *Steatonyssus* species of the Ethiopian region followed by the descriptions of the two new species and notes on the known ones. We have also included *St.viator* Hirst which was described from Calcutta, India but as the host, *Apus affinis* (Indian swift), is known to occur in Africa it is possible that this mite may also be found here at some future date.

I Key to the females of the Ethiopian species of the Genus Steatonyssus Kolenati.

1 (4) Posterior margin of sternal plate strongly sclerotised, thickened . . 2

2 (3) Second and third coxae each with a short, strong, pointed ventral spur. Length of idiosoma: 0.63-0.7mm. — Anglo-Egyptian Sudan, off *Liponycteris nudiventris* Cretzschmar

1. **sudanensis** (Hirst, 1926)

3 (2) Second and third coxae without ventral spurs. Length of idiosoma: 0.85 mm. (fig. 1) — Nyasaland, off Elephant Shrew, ? Anglo-Egyptian Sudan off *Scotophilus murinoflavus* (Heuglin).

2. **nyassae** (Hirst, 1922)

4 (1) Posterior margin of sternal plate weakly or moderately sclerotised, not thickened 5

5 (10) Sternal plate very short, band-shaped, length: breath 0.16 or less 6

6 (9) Prosomal shield with postero-median projection, sternal plate with length: breadth 0.14-0.16 mm. 7

7 (8) Peritreme short, reaching to between 2nd. and 3rd. coxae, hairs at posterior tip of body very long, at least twice as long as other hairs on dorsum and venter (fig. 2) Length of idiosoma: 0.55-0.60 mm. — Transvaal, off *Plocepasser mahali* Smith

3. **similis** n.sp.

8 (7) Peritreme longer, reaching middle of second coxa or further forwards, hairs at posterior tip of body only slightly longer than other hairs on dorsum and venter. (Hirst 1922. fig. 20). Length of idiosoma: 0.65-0.87 mm. — India, ? South Africa off *Apus affinis* (Gray).

4. **viator** (Hirst, 1922)

9 (6) Prosomal shield with straight posterior border; sternal plate a very narrow transverse strip with length : breadth 0.09 (Zumpt and Patterson, 1952; fig. 3).
Length of idiosoma: 0.63 mm. — Transvaal, Orange Free State, Cape Province, off *Ploceus velatus* Vieillot, *Creatophora cinereus* (Meuschen), *Onychognathus morio* (Linn.), and *Passer melanura* (Müller).

5. **reedi** Zpt. & Patt. (1952)

10 (5) Sternal plate much longer, length : breadth 0.3 or more 11

11 (12) Sternal plate smooth (Zumpt & Patterson, 1951, fig. 8)
Length of idiosoma: 0.75 mm. — Natal, off *Miniopterus natalensis* Smith.

6. **natalensis** Zpt. & Patt. (1951)

12 (11) Sternal plate strongly reticulated 13

13 (14) Long fine hairs at posterior tip of body, hairs on venter sparse (about 12 pairs), fine, twelve fine hairs on opisthosomal shield (Hirst, 1922; figs. 21-22)
Length of idiosoma: 0.65 mm. — S. Africa and Mozambique off *Dendropicos fuscescens* (Vieillot), N. Rhodesia off *Campethera abingoni* (Smith)

7. **biscutatus** (Hirst, 1922)

14 (13) Hairs at posterior tip of body not markedly longer than others, but thickened and spine-like, hairs on venter numerous, 16 long bristles and 8 short, fine hairs on opisthosomal shield (fig. 3)
Length of idiosoma: 0.69-0.84 mm. — Kenya, off *Pipistrellus nanus* (Peters)

8. **eos** n.sp.

II. Notes and descriptions of species.

1. **Steatonyssus sudanensis** (Hirst, 1926)[1])

This species has not been recorded since its original description from the bat *Liponycteris nudiventris* Cretzschmar, collected near Khartoum, Sudan. We have not seen Hirst's type specimens, but it should not be difficult to recognise this species according to the features mentioned in the key. Unfortunately, Hirst has not published a drawing of this mite.

2. **Steatonyssus nyassae** (Hirst, 1922).

Through the kindness of Dr. Owen Evans, we have been able to study one of Hirst's paratypes. A drawing (fig. 1) has been made from this specimen and the description completed as follows:

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[1]) We have recently received a paratype from the British Museum and are able to confirm Hirst's description.

Female (fig. 1). Body length 0.85 mm. The two dorsal shields both have a distinct reticular pattern. The prosomal shield is 0.25 mm. long and 0.21 mm. broad, at its widest point, and bears 11 pairs of long hairs. The opisthosomal shield measures 0.26 mm. in length and 0.15 mm. at its widest part, and bears 21 long hairs and 3 pairs of shorter ones at the posterior tip. The sternal plate, which has a thickened posterior margin, measures 0.45 mm. in length and 0.11 mm. in width at the level of the 2nd pair of hairs. The genital plate measures 0.11 mm. from the level of its single pair of hairs to the tip, and 0.072 mm. between the hairs. The pear-shaped anal plate is 0.125 mm. long and 0.075 mm. wide.

The leg measurements are given (in μ) in the following table:

No. of leg	Tarsus	Tibia	Genu	Femur	Trochanter
I	165	85	75	100	42
II	120	60	62	85	55
III	130	50	55	80	45
IV	140	75	85	100	70

As mentioned above, the typical series of specimens was taken from an elephant shrew (*Elephantulus* spec.) in Nyasaland. We have never found *St. nyassae* on these animals, but recently received a pair from the bat *Scotophilus murinoflavus* (Heuglin), leg. W. Büttiker near Torit, Anglo-Egyptian Sudan, 17.II.1952, which agrees with the typical specimen of *nyassae* in every respect except that the opisthosomal shield bears twenty instead of twenty-seven hairs. Hirst does not state the number of these hairs in his description, so that we do not know whether the other paratypical specimens also have twenty-seven hairs or whether this pattern is variable. As this possibility cannot be excluded, we have decided to regard our specimens as *St. nyassae* until additional material becomes available.

3. **Steatonyssus similis** n.sp.

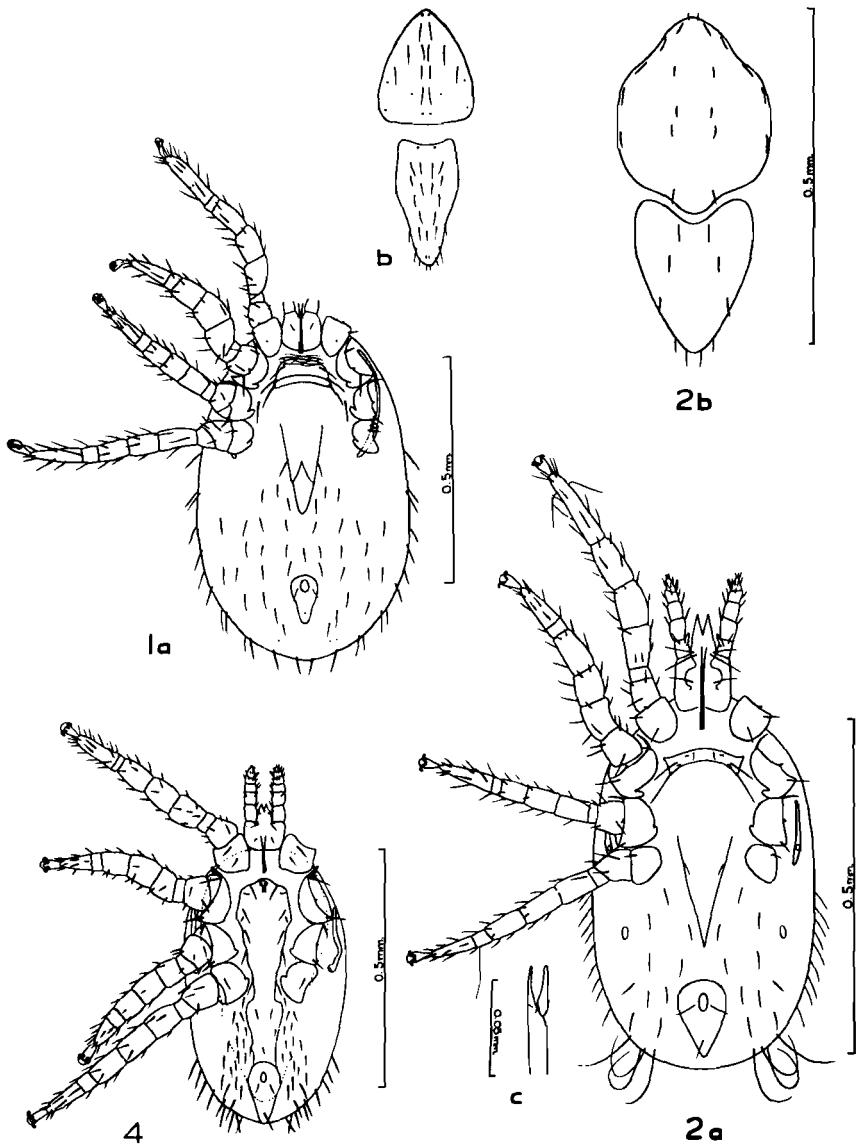
This species very closely resembles *S. viator* Hirst. We have not seen *S. viator*, but according to Hirst's (1922) description and a drawing of the

FIGURES 1, 2, 4

Fig. 1. *Steatonyssus nyassae* (Hirst).
(a) Ventral surface of female.
(b) Dorsal shields.

Fig. 2. *Steatonyssus similis* n.sp.
(a) Ventral surface of female.
(b) Dorsal shields.
(c) Chela.

Fig. 4. *Steatonyssus eos* n.sp.
Ventral surface of male, with dorsal shield dotted.



venter sent us by Dr. Owen Evans of the British Museum, these two species may be separated by the peritreme, which reaches to between the 2nd. and 3rd. coxae in *similis* and to the "middle of the second coxa or somewhat further forwards" in *viator*, and by the presence of very long slender hairs at the posterior tip of the body in *similis*. The genital plate tapers to a very fine point in *similis*, whereas in *viator* the posterior end is rather blunt.

Female (fig. 2) — The dorsal shields are smooth, and shaped as shown in the figure. The prosomal shield has a median, posterior projection and is 0.290 mm long in the holotype (0.279-0.299 in the paratypes) and measures 0.227 mm at the widest part (0.207-0.259 mm in the paratypes), giving an index of 0.83.

The opisthosomal shield is strongly concave anteriorly, 0.217 mm. long in the holotype (0.207-0.227 mm. in the paratypes) and 0.186 mm. at its widest point (0.176-0.196 mm. in the paratypes), giving an index of 0.85. The anterior shield bears 10 pairs, and the posterior one, 5 pairs of short, fine hairs. The idiosoma reaches a length of 0.55 mm. in the holotype and 0.55-0.60 mm. in the paratypes.

The weakly sclerotised sternal plate has the form of a narrow transverse strip with the posterior margin slightly concave. It bears 3 pairs of hairs, the first being much shorter than the other two, and 2 pairs of pores. Its median length is 0.018 mm. (0.013-0.025 mm. in the paratypes) and its breadth at the level of the 2nd. pair of hairs is 0.135 mm. (0.115-0.135 mm. in the paratypes), giving an index of 0.14. No metasternal bristle or plate can be distinguished. The genital plate tapers to a very sharp point. Its length, from the level of the genital hairs to the tip, is 0.114 mm. (0.114-0.134 mm. in the paratypes) and the width between the hairs is 0.062 mm. The anal plate is pear-shaped, measuring 0.114 mm. in length (0.093-0.114 mm. in paratypes) and 0.072 mm. in breadth (0.072-0.083 mm. in paratypes), giving an index of 0.71. The outer pair of oval metapodal plates is present. The soft part of the venter bears about 10 pairs of fine, moderately long hairs, and at the posterior tip of the body there are 4 pairs of hairs approximately twice the length of the remaining hairs on the uncovered parts of the dorsum and venter. The peritremes are short, reaching to between the 2nd. and 3rd. coxae, and there is a prominent spine on the first free palpal segment.

The measurements of 10 females (in mm.) and the leg measurements of the holotype (in μ) are given in the tables on page 53.

Male and nymphal stages unknown.

The species is based on 88 females collected from the sparrow weaver, *Plocepasser mahali* Smith, near Potchefstroom, Transvaal, 11.I.1953.

Holotype (♀) and partypes in the collection of the Sout African Institute for Medical Research, Johannesburg. Paratypes have been presented to the British Museum, London, the Natal Museum, Pietermaritzburg and the National Museum of Natural History, Paris.

Measurements of females (in mm.) Steatonyssus similis n sp.

	Sternal Plate		Genital Plate		Anal Plate		Prosomal Shield		Opisthosomal Shield		Idiosoma
	L	B	L	B	L	B	L	B	L	B	L
Holotype											
1	0.018	0.135	0.114	0.062	0.114	0.072	0.290	0.227	0.217	0.186	0.548
2	0.013	0.115	0.124	0.062	0.093	0.072	0.279	0.207	0.207	0.186	0.569
3	0.020	0.120	0.124	0.062	0.103	0.072	0.290	0.248	0.217	0.186	0.589
4	0.018	0.115	0.124	0.072	0.103	0.083	0.290	0.248	0.207	0.186	0.569
5	0.018	0.120	0.124	0.062	0.114	0.083	0.299	0.227	0.207	0.196	0.600
6	0.018	0.125	0.114	0.062	0.103	0.072	0.290	0.248	0.217	0.176	0.579
7	0.018	0.135	0.114	0.062	0.103	0.072	0.290	0.248	0.207	0.186	0.548
8	0.025	0.135	0.124	0.062	0.103	0.072	0.290	0.259	0.227	0.186	0.589
9	0.018	0.125	0.124	0.062	0.103	0.072	0.279	0.259	0.217	0.176	0.569
10	0.018	0.120	0.134	0.062	0.103	0.083	0.290	0.227	0.227	0.186	0.589
Av:	0.018	0.125	0.122	0.063	0.104	0.074	0.289	0.240	0.215	0.183	0.575
Ratios	0.14		0.5		0.71		0.83		0.85		

Leg measurements of Holotype (in μ)

Number of leg	Tarsus	Tibia	Genu	Femur	Trochanter
I	125	70	65	75	35
II	90	50	55	65	50
III	100	45	50	65	40
IV	115	60	65	70	50

4. **Steatonyssus viator** (Hirst, 1922).

We have not seen this species which was described from nests of the Indian swift, *Apus affinis* (Gray), in Calcutta. As this bird occurs in Africa too, it is to be expected that its parasites will also be found in the Ethiopian region.

5. **Steatonyssus reedi** Zpt. & Patt. (1952).

This species appears to be very common in S. Africa. It was originally recorded from nests of the masked weaver, *Ploceus velatus* Vieillot, and has

since been received from nests and bodies of the wattled starling, *Creatophora cinereus* (Meuschen), the redwing starling, *Onychognathus morio* (L.) and the Cape sparrow, *Passer melanura* (Müller).

6. **Steatonyssus natalensis** Zpt. & Patt. (1951).

Only one pair is known of this bat-infesting species, which was collected from *Miniopterus natalensis* Smith in a cave near Pietermaritzburg, Natal.

7. **Steatonyssus biscutatus** (Hirst, 1922).

This mite is probably restricted to the nests of woodpeckers. It was described originally from the cardinal woodpecker, *Dendropicos fuscescens* (Vieillot), in South Africa. We have received specimens from the same host near Buffelsdraai, Transvaal, and near Massangena, Mozambique. Recently

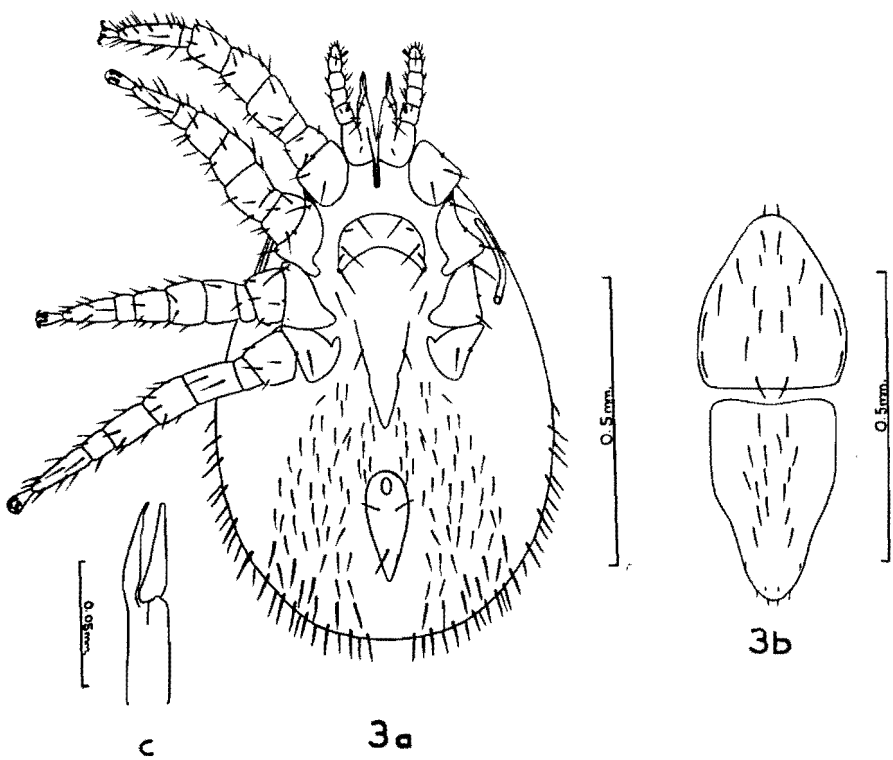


Fig. 3. *Steatonyssus cos* n.sp.
(a) Ventral surface of female.
(b) Dorsal shields.
(c) Chela.

we received specimens from the nests of the golden-tailed woodpecker, *Campethera abingoni* (Smith), in Luanshya, Northern Rhodesia.

8. **Steatonyssus eos** n.sp.

In the keys given by Zumpt & Patterson (1951) and by Hirst (1922), this species keys out to *Steatonyssus biscutatus* Hirst. It is, however, quite distinct from *biscutatus,* differing from it in several respects. The hairs covering the dorsal and ventral surfaces of *eos* are coarser than in *biscutatus* especially at the posterior tip of the body where the hairs are thickened and spine-like. The posterior dorsal shield in *eos* bears 14-16 long, coarse hairs and 8 short, fine ones, whereas in *biscutatus* this shield bears 12 fine hairs of moderate length. The soft part of the venter bears numerous hairs in *eos* and only about 12 pairs in *biscutatus.* The hairs on the sternal plate are all approximately the same length in *cos.* whilst in *biscutatus* the second and third pairs are much longer than the first. *St. cos* also differs from *biscutatus* in having a longer anal plate and shorter peritremes.

Female (fig. 3) — The dorsal shields are both very strongly reticulated. The prosomal shield is 0.290 mm. long in the holotype (0.279-0.310 mm. in the paratypes) and measures 0.259 mm. at its widest part (0.259-0.279 mm. in the paratypes), giving an index of 0.91. It bears 11 pairs of long hairs. The opisthosomal shield is 0.331 mm. long in the holotype (0.321-0.346 mm. in the paratypes) and 0.217 mm. at its widest part (0.207-0.217 mm. in the paratypes), giving an index of 0.63. This shield bears 14-16 long hairs arranged asymmetrically near the midline and 4 pairs of short fine hairs posteriorly. The idiosoma surpasses the dorsal shields laterally and posteriorly, reaching a length of 0.84 mm. in the holotype and 0.69-0.83 mm. in the paratypes.

The sternal plate is roughly rectangular in shape with a concave posterior margin, the lateral and anterior margins being weakly defined. It is strongly reticulated and bears the usual three pairs of hairs and two pairs of pores. The length of the sternal plate is 0.062 mm. in the holotype (0.058-0.062 mm. in the paratypes) and the width at the level of the 2nd pair of bristles is 0.134 mm. (0.124-0.156 mm. in the paratypes), giving an index of 0.43. One pair of metasternal bristles is present, but there is no visible platelet. The genital plate is pointed and bears one pair of bristles. Its length from the level of the bristles to the tip is 0.134 mm. in the holotype (0.124-0.156 mm. in the paratypes) and the width between the bristles is 0.072 mm. (0.067-0.083 mm. in the paratypes). The anal plate is approximately twice as long as broad, measuring 0.186 × 0.083 mm. in the holotype (0.165.-0.186 × 0.083-0.093 mm. in the paratypes) giving an index of 0.47. It bears the usual three bristles, the shorter paired ones being situated some distance behind the anal opening. The peritremes are short, not quite reaching the middle of the 2nd coxa. The soft part of the venter bears numerous hairs, the posterior ones being thick and spine-like. There is a prominent tooth-like projection on the first free palpal segment.

The measurements of ten females (in mm.) and the leg measurements of the holotype (in μ) are given in the accompanying tables.

Measurements of females (in mm.) Steatonyssus eos n.sp.

♀	Sternal Plate		Genital Plate		Anal Plate		Prosomal shield		Opisthosomal shield		Idiosoma
	L	B	L	B	L	B	L	B	L	B	L
Holotype											
1	0.062	0.134	0.134	0.072	0.186	0.083	0.290	0.259	0.331	0.217	0.838
2	0.062	0.145	0.114	0.083	0.176	0.093	0.279	0.269	0.341	0.207	0.765
3	0.058	0.134	0.124	0.072	0.176	0.083	0.290	0.279	0.346	0.217	0.786
4	0.062	0.145	0.134	0.067	0.186	0.088	0.310	0.269	0.336	0.207	0.796
5	0.058	0.124	0.134	0.072	0.170	0.088	0.284	0.259	0.321	0.207	0.827
6	0,058	0.156	0.134	0.072	0.176	0.083	0.299	0.269	0.341	0.207	0.734
7	0.062	0.145	0.114	0.072	0.165	0.083	0.299	0.269	0.336	0.207	0.796
8	0.062	0.145	0,124	0.083	0.176	0.083	0.299	0.269	0.341	0.217	0.776
9	0.058	0.134	0.124	0.072	0.176	0.083	0.290	0.279	0.321	0.217	0.693
10	0.058	0.156	0.124	0.072	0.186	0.088	0.290	0.269	0,341	0.207	0.776
Av.	0.060	0.141	0.126	0.074	0.177	0.086	0.294	0.269	0.336	0.211	0.779
Ratios:	0.43		0.60		0.47		0.91		0.63		

Leg measurements of holotype (in μ)

Number of leg	Tarsus	Tibia	Genu	Femur	Trochanter
I	120	75	62	88	50
II	120	65	50	75	50
III	125	55	50	88	50
IV	160	78	75	112	75

Male (fig. 4) — The males have an average body length of 0.592 mm. (0.558-0.610 mm.). The dorsal shield is widest between the second and third pairs of legs, tapering posteriorly. It has an average length of 0.539 mm. (0.517-0.569 mm) and greatest width of 0.263 mm. (0.259-0.269 mm). It is strongly reticulated as in the female and bears 33-38 longer hairs, in addition

to 4 pairs of shorter, finer, posterior hairs. The holoventral plate is narrow and strongly reticulate and bears 15-17 hairs. The margin is irregular so that hairs which are situated on the plate on one side of the animal may be situated on soft skin on the other side. The soft part of the venter bears about 23 pairs of hairs, the posterior ones being thickened bristles as in the female.

The description is based on 7 males and 49 females collected by Miss J. B. Walker from *Pipistrellus nanus* (Peters) at Muhoroni, Kenya, 22.XII.52. The holotype (♀) and partypes are in the collection of the South African Institute for Medical Research, Johannesburg. Paratypes have been returned to Miss Walker and others have been presented to the British Museum, London, the Natal Museum, Pietermaritzburg, and the National Museum of Natural History, Paris.

Acknowledgements.

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